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Dated: May 24, 2004

Signature:   
Staci Harris



Docket No.: HO-P00965US0  
(PATENT)

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
James M. Musser, et al.

Application No.: 08/160,965

Filed: December 2, 1993

Art Unit: 1645

For: VACCINES CONTAINING CYSTEINE  
PROTEASE AND METHODS TO PROTECT  
AGAINST GROUP A STREPTOCOCCI

Examiner: J. Hines

### REPLY BRIEF

MS Reply Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

This brief is to the Examiner's Answer mailed March 25, 2004. Applicants believe no fees are due with this response. However, if Applicants are in error, the Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 06-2375, under Order No. 09507112.

Appellants herewith submit three copies of the Reply Brief.

**ISSUE: Are claims 1, 4-35, 46 and 47 described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention?**

The issue remains the same, the only new item is the following in which the Appellants direct the Examiner to the attached sequences that were obtained from GenBank, which are associated with accession numbers identified in the inventor's own article "A conserved *Streptococcus pyogenes* extracellular cysteine protease cleaves human fibronectin and degrades vitronectin" by Kapur et al., *Microbial Pathogenesis* **Nov. 1993**; 15: 327-346 ("Kapur reference").

In the Examiner's Answer, the Examiner states that the Appellants failed to point to one piece of art that contained a sequence that is allegedly "known and old" in the art. Appellants have maintained that the instant specification in addition to the Kapur reference provided evidence that the inventors had possession of the invention at the time of filing. The Kapur reference (which was published prior to the filing date of the instant application) reported the methodical and prolific sequencing of 39 SPEB alleles in 67 *S. pyogenes* strains. The Examiner appears to have misunderstood the significance of the Kapur reference since the Examiner believes that the Appellants are arguing that in every ten amino acids one or two amino acids vary. This is not correct. The significance of the Kapur reference is to provide evidence that the *speB* gene is well conserved (See Abstract), as well as, to provide evidence of the GenBank accession numbers (listed in the **figure legend** of Figure 3) assigned to the polynucleotide sequences coding for the complete amino acid sequences of the allelic variants of *speB* (EMBL/GenBank/DDBL accession numbers L26125-L26162).

As the Appellants have stressed, the claims are directed to a SPEB protein having at least one substitution at amino acid residue positions Lys145, Cys192, His340, Asn356 and/or Trp357 (Appellants refer the Examiner to the accompanying amendment filed concurrently with this Reply Brief). All of the claimed amino acid residue positions are highly conserved among the *speB* alleles, as evident from the Kapur reference. To further illustrate this point, Appellants have provided copies of the amino acid sequences available from GenBank. These sequences were available as of the filing date of the application,

December 2, 1993 (date is highlighted on all attached sequences). Appellants assert that the attached amino acid sequences correspond to the alleles identified as GenBank accession numbers L26125-L26162, which is indicated in the **figure legend** of Figure 3. One of skill in the art is aware that the GenBank database provides a link between the polynucleotide sequences and the amino acid sequences, thus, one of skill in the art would be able to obtain the amino acid sequence by entering the accession numbers for the polynucleotide acid sequences.

To further aide the Examiner, Appellants have highlighted in pink the specific amino acid positions that are claimed in the present invention, i.e., Lys145, Cys192, His340, Asn356 and/or Trp357 (One letter codes for the amino acids which are well known are as follows: lysine is L, cysteine is C, histamine is H, asparagine is N and tryptophan is W). From this evidence, the Examiner will notice that all sequences associated with accession numbers L26125-L26162 contain the same amino acids at the claimed amino acid positions. Since these amino acids are conserved in all alleles, it is not relevant to have a “wild-type” sequence as requested by the Examiner because all the sequences could be the initial starting sequence in which Lys145, Cys192, His340, Asn356 and/or Trp357 are substituted. Thus, one of skill in the art could utilize the GenBank database to obtain an SPEB sequence to produce the claimed invention.

Even if a person of skill in the art was not aware of the Kapur reference to obtain the GenBank accession numbers, one of skill in the art could search the GenBank database using the identified MGAS (Musser Group A Streptococcus) numbers in Table 1, pages 9-18, of the specification. These numbers are also highlighted in the attached copies obtained from the GenBank database. The attached sequence copies provide evidence that the MGAS numbers are linked to the GenBank accession numbers L26125-L26162, which are linked to the SPEB amino acid sequences. Thus, one of skill in the art would be able to locate the SPEB sequences to produce the claimed invention.

Appellants remind the Examiner that the GenBank database is utilized consistently by those of skill in this art, and it is well-settled case law that what is conventional or well known to a skilled artisan need not be disclosed in detail. See *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d at 1384, 231 USPQ at 94. Therefore, the complete polynucleotide and amino acids structure of the SPEB protein used as a reference sequence to generate the

invention of the instant claims was available to skilled artisans at the time of the instant application and *is not required, given that the sequence was in the public domain prior to the time of filing.*

Thus, in summary, Appellant asserts that the specification did provide clear possession of the invention. Appellant reminds the Board that the written description requirement is a question of fact which must be resolved on a case-by-case basis (see, e.g. *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ 2d at 1116 (Fed. Cir. 1991)), and Appellant asserts that the instant specification certainly met the standards for written description under 35 U.S.C. §112, paragraph 1.

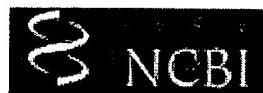
Appellant respectfully requests reversal of the Examiner's rejection and subsequent allowance of all pending claims.

Dated: May 24, 2004

Respectfully submitted,

By   
Melissa W. Acosta  
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(713) 651-5246 (Fax)  
Attorneys for Applicant



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Show:  1: AAA26979. pyrogenic exotoxi...[gi:431614]

BLink, Domains, Links

LOCUS AAA26979 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26979

VERSION AAA26979.1 GI:431614

DBSOURCE locus STRSPEBA accession L26125.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

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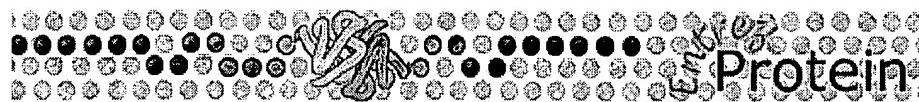
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Feat

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LOCUS AAA26992 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26992

VERSION AAA26992.1 GI:431640

DBSOURCE locus STRSPEBB accession L26126.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

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[BLINK](#), [Domains](#), [Links](#)

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**DEFINITION** pyrogenic exotoxin B.

**ACCESSION** AAA26993

**VERSION** AAA26993.1 GI:431642

**DBSOURCE** locus STRSPEBC accession [L26127.1](#)

**KEYWORDS**

**SOURCE** Streptococcus pyogenes

**ORGANISM** [Streptococcus pyogenes](#)

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

**REFERENCE** 1 (residues 1 to 398)

**AUTHORS** Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

**TITLE** A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

**JOURNAL** Microb. Pathog. (1993) In press

**COMMENT** Method: conceptual translation.

**FEATURES** Location/Qualifiers

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DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26994

VERSION AAA26994.1 GI:431644

DBSOURCE locus STRSPEBD accession L26128.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R., Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

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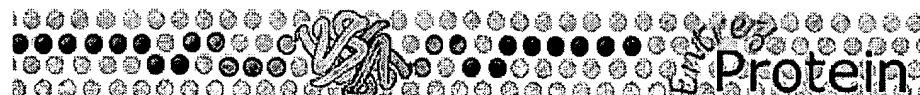
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BLINK, Domains, Links

LOCUS AAA26995 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26995

VERSION AAA26995.1 GI:431646

DBSOURCE locus STRSPEBE accession L26129.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

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CDS

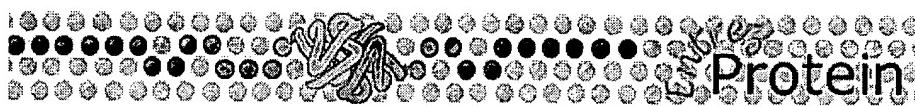
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File

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**DEFINITION** pyrogenic exotoxin B.  
**ACCESSION** AAA26996  
**VERSION** AAA26996.1 GI:431648  
**DBSOURCE** locus STRSPEBF accession L26130.1  
**KEYWORDS**  
**SOURCE** Streptococcus pyogenes  
**ORGANISM** Streptococcus pyogenes  
Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.  
**REFERENCE** 1 (residues 1 to 398)  
**AUTHORS** Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.  
**TITLE** A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin  
**JOURNAL** Microb. Pathog. (1993) In press  
**COMMENT** Method: conceptual translation.  
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LOCUS AAA26997 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26997

VERSION AAA26997.1 GI:431650

DBSOURCE locus STRSPEBG accession L26131.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

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LOCUS AAA26998 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26998

VERSION AAA26998.1 GI:431652

DBSOURCE locus STRSPEBH accession L26132.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

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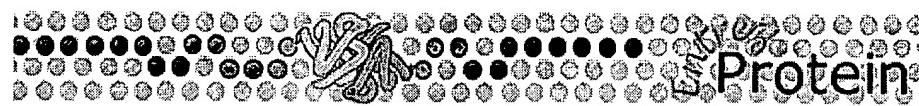
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301 svhqinrsdf skqdweaqid kelsqnqpv yqgvgkvgg afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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PMC

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File

1: AAA26999. pyrogenic exotoxin B [gi:431654] BLINK, Domains, Links

LOCUS AAA26999 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26999

VERSION AAA26999.1 GI:431654

DBSOURCE locus STRSPEBI accession L26133.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

1..398  
 /organism="Streptococcus pyogenes"  
 /isolate="MGAS 302"  
 /db\_xref="taxon:1314"

Protein

1..398  
 /product="pyrogenic exotoxin B"  
 /function="cysteine protease precursor"

CDS

1..398  
 /gene="speB gene"  
 /coded\_by="L26133.1:161..1357"  
 /note="allele 17"  
 /transl\_table=11

ORIGIN

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1 mnkkklgirl lsllalggfv lanpvfadqn farnekeakd saitfiqksa aikagarsae
61 dikldkvnlg gelsgsnmyv ynistggfvi vsgdkrspei lgystsgsf fd angkeniasf
121 mesyveqike nkldttypag taeikqpvvk slldskgihy nqgnpynllt pviiekvpge
181 qsfvgqhaat g@vatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdwesqid kelsqnqpvy yqgvgkvgg@ afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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1: AAA27000. pyrogenic exotoxin B [gi:431656]

BLink, Domains, Links

LOCUS AAA27000 398 aa linear BCT 02-DEC-1993  
 DEFINITION pyrogenic exotoxin B.  
 ACCESSION AAA27000  
 VERSION AAA27000.1 GI:431656  
 DBSOURCE locus STRSPEBJ accession L26134.1  
 KEYWORDS .  
 SOURCE Streptococcus pyogenes  
 ORGANISM Streptococcus pyogenes  
 Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
 Streptococcus.  
 REFERENCE 1 (residues 1 to 398)  
 AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
 Hamill,R.J., Patti,J.M. and Musser,J.M.  
 TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
 cleaves human fibronectin and degrades vitronectin  
 JOURNAL Microb. Pathog. (1993) In press  
 COMMENT Method: conceptual translation.  
 FEATURES Location/Qualifiers  
 source 1..398  
 /organism="Streptococcus pyogenes"  
 /isolate="MGAS 587"  
 /db\_xref="taxon:1314"  
 Protein 1..398  
 /product="pyrogenic exotoxin B"  
 /function="cysteine protease precursor"  
 CDS 1..398  
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 /coded\_by="L26134.1:161..1357"  
 /note="allele 18"  
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## ORIGIN

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121 mesyveqike nkkldttypag taeikqpvvk slldskgiyh nqgnpynl1t pviiekvpge
181 qsfvgqhaat gavataqa1 mkyhnypnkg lkdtyt1ss npyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alrenfgynq
301 svhqinrsdf skqdwesqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvngwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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1: AAA27001. pyrogenic exotoxin B.[gi:431658]

LOCUS	AAA27001	398 aa	linear	BCT 02-DEC-1993
DEFINITION	pyrogenic exotoxin B.			
ACCESSION	AAA27001			
VERSION	AAA27001.1 GI:431658			
DBSOURCE	locus STRSPEBK accession L26135.1			
KEYWORDS	.			
SOURCE	Streptococcus pyogenes			
ORGANISM	Streptococcus pyogenes Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.			
REFERENCE	1 (residues 1 to 398)			
AUTHORS	Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.			
TITLE	A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin			
JOURNAL	Microb. Pathog. (1993) In press			
COMMENT	Method: conceptual translation.			
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Protein	1..398 /product="pyrogenic exotoxin B" /function="cysteine protease precursor"			
CDS	1..398 /gene="speB gene" /coded_by="L26135.1:161..1357" /note="allele 19" /transl_table=11			

## ORIGIN

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121 mesyveqike nkkldttypag taeikgpvvk slldskgiyh nqgnpynllt pviekvpge
181 qsfvgqhaat gcvatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygps gsagssrvqr alkenfgynq
301 svhqinrsdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvawwgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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1: AAA27002. pyrogenic exotoxin B [gi:431660]

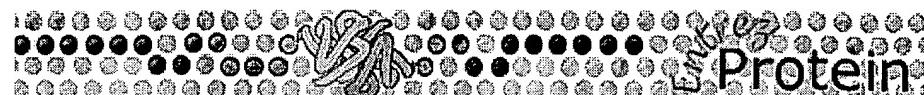
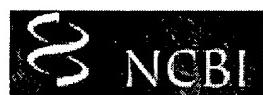
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 DEFINITION pyrogenic exotoxin B.  
 ACCESSION AAA27002  
 VERSION AAA27002.1 GI:431660  
 DBSOURCE locus STRSPEBL accession L26136.1  
 KEYWORDS .  
 SOURCE Streptococcus pyogenes  
 ORGANISM Streptococcus pyogenes  
 Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
 Streptococcus.  
 REFERENCE 1 (residues 1 to 398)  
 AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
 Hamill, R.J., Patti, J.M. and Musser, J.M.  
 TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
 cleaves human fibronectin and degrades vitronectin  
 JOURNAL Microb. Pathog. (1993) In press  
 COMMENT Method: conceptual translation.  
 FEATURES Location/Qualifiers  
 source 1..398  
 /organism="Streptococcus pyogenes"  
 /isolate="MGAS 800"  
 /db\_xref="taxon:1314"  
 Protein 1..398  
 /product="pyrogenic exotoxin B"  
 CDS 1..398  
 /gene="speB gene"  
 /coded\_by="L26136.1:161..1357"  
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#### ORIGIN

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121 mesyveqike nkkldttag taeikqpvvk slldskgiyh nqgnpylnlt pviiekvpge
181 qsfvgqhaat g@vatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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 1: AAA27003. pyrogenic exotoxin B...[gi:431662]

BLINK, Domains, Links

LOCUS AAA27003 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27003

VERSION AAA27003.1 GI:431662

DBSOURCE locus STRSPEBM accession L26137.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

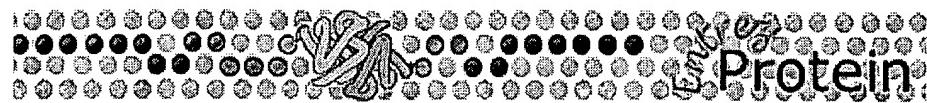
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/function="cysteine protease precursor"CDS 1..398  
/gene="speB gene"  
/coded\_by="L26137.1:161..1357"  
/note="allele 21"  
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ORIGIN

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61 dikldkvnlg gelsgsnmyv ynistggfvi vsgdkrspei lgystsgsf angkeniasf
121 mesyveqike nkkldttypag taeikqpvvk slldskgiyh nqgnpylnlt pvikvpge
181 qsfvgqhaat gcvataqai mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdwesqid kelsqnqpvy yqgvgkvgga afvidgadgr nfyhvnwgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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1: AAA27004. pyrogenic exotoxin B [gi:431664]

BLink, Domains, Links

LOCUS AAA27004 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27004

VERSION AAA27004.1 GI:431664

DBSOURCE locus STRSPEBN accession L26138.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

1..398  
 /organism="Streptococcus pyogenes"  
 /isolate="MGAS 1226"  
 /db\_xref="taxon:1314"

Protein

1..398  
 /product="pyrogenic exotoxin B"  
 /function="cysteine protease precursor"

CDS

1..398  
 /gene="speB gene"  
 /coded\_by="L26138.1:161..1357"  
 /note="allele 22"  
 /transl\_table=11

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121 mesyveqike nkkldttypag taeikgpvvk slldskgiyh nqgnpynllt pviiekvpge
181 qsfvgqhaat gcvataataqi mkyhnypnkg lkdtytltss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrgdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvggwgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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1: AAA27005. pyrogenic exotoxin B [gi:431666]

LOCUS	AAA27005	398 aa	linear	BCT 02-DEC-1993
DEFINITION	pyrogenic exotoxin B.			
ACCESSION	AAA27005			
VERSION	AAA27005.1 GI:431666			
DBSOURCE	locus STRSPEBO accession <a href="#">L26139.1</a>			
KEYWORDS	.			
SOURCE	Streptococcus pyogenes			
ORGANISM	<u>Streptococcus pyogenes</u> Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.			
REFERENCE	1 (residues 1 to 398)			
AUTHORS	Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.			
TITLE	A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin			
JOURNAL	Microb. Pathog. (1993) In press			
COMMENT	Method: conceptual translation.			
FEATURES	Location/Qualifiers			
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Protein	1..398 /product="pyrogenic exotoxin B" /function="cysteine protease precursor"			
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1: AAA27006. pyrogenic exotoxi...[gi:431668]

BLink, Domains, Links

LOCUS AAA27006 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27006

VERSION AAA27006.1 GI:431668

DBSOURCE locus STRSPEBP accession L26140.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398  
           /organism="Streptococcus pyogenes"  
           /isolate="MGAS 659"  
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           /db\_xref="taxon:1314"

Protein 1..398  
           /product="pyrogenic exotoxin B"  
           /function="cysteine protease precursor"

CDS 1..398  
       /gene="speB gene"  
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       /transl\_table=11

ORIGIN

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121 mesyveqike nkkldttypag taeiRqpvvk slldskgiyh nqgnpyynllt pviekvpge
181 qsfvgqhaat g@vatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpsS gsagssrvqr alkenfgynq
301 svhqiinrgdf skqdweaqid kelsqnqpvY yqgvgkvgg@ afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfnqyq savvgikp
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1: AAA27007. pyrogenic exotoxin B [gi:431670]

LOCUS	AAA27007	398 aa	linear	BCT 02-DEC-1993
DEFINITION	pyrogenic exotoxin B.			
ACCESSION	AAA27007			
VERSION	AAA27007.1 GI:431670			
DBSOURCE	locus STRSPEBQ accession L26141.1			
KEYWORDS	.			
SOURCE	Streptococcus pyogenes			
ORGANISM	<u>Streptococcus pyogenes</u> Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.			
REFERENCE	1 (residues 1 to 398)			
AUTHORS	Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.			
TITLE	A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin			
JOURNAL	Microb. Pathog. (1993) In press			
COMMENT	Method: conceptual translation.			
FEATURES	Location/Qualifiers			
source	1..398 /organism="Streptococcus pyogenes" /isolate="MGAS 168" /db_xref="taxon:1314"			
Protein	1..398 /product="pyrogenic exotoxin B" /function="cysteine protease precursor"			
CDS	1..398 /gene="speB gene" /coded_by="L26141.1:161..1357" /note="allele 25" /transl_table=11			
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1: AAA27008. pyrogenic exotoxin B [gi:431672]

BLINK, Domains, Links

LOCUS AAA27008 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27008

VERSION AAA27008.1 GI:431672

DBSOURCE locus STRSPEBR accession L26142.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398  
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           /isolate="MGAS 1914A"  
           /isolate="MGAS 1911"  
           /isolate="MGAS 758"  
           /db\_xref="taxon:1314"

Protein 1..398  
           /product="pyrogenic exotoxin B"  
           /function="cysteine protease precursor"

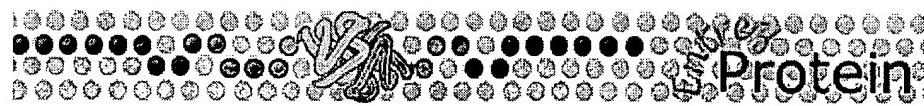
CDS 1..398  
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       /coded\_by="L26142.1:161..1357"  
       /note="allele 26"  
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ORIGIN

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241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
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 Get Subsequence Features 1: AAA27009. pyrogenic exotoxin B [gi:431674]

BLINK, Domains, Links

LOCUS AAA27009 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27009

VERSION AAA27009.1 GI:431674

DBSOURCE locus STRSPEBS accession [L26143.1](#)

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398  
/organism="Streptococcus pyogenes"  
/isolate="MGAS 1990"  
/db\_xref="taxon:1314"Protein 1..398  
/product="pyrogenic exotoxin B"  
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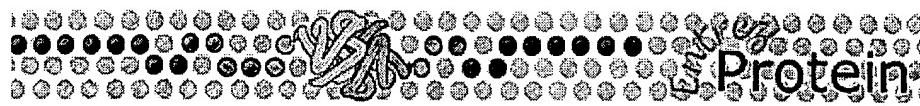
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241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvwwgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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 1: AAA27010. pyrogenic exotoxi...[gi:431676]

BLINK, Domains, Links

LOCUS AAA27010 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27010

VERSION AAA27010.1 GI:431676

DBSOURCE locus STRSPEBT accession L26144.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

1..398  
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Protein

1..398  
/product="pyrogenic exotoxin B"  
/function="cysteine protease precursor"

CDS

1..398  
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/transl\_table=11

ORIGIN

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361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp

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1: AAA27011. pyrogenic exotoxin B [gi:431678]

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LOCUS AAA27011 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27011

VERSION AAA27011.1 GI:431678

DBSOURCE locus STRSPEBU accession [L26145.1](#)

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM [Streptococcus pyogenes](#)

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL [Microb. Pathog.](#) (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398

/organism="Streptococcus pyogenes"

/isolate="MGAS 1841"

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Protein 1..398

/product="pyrogenic exotoxin B"

/function="cysteine protease precursor"

CDS 1..398

/gene="speB gene"

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#### ORIGIN

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121 mesyveqike nkkldttypag taeifqpvvk slldskgiyh nqgnpynllt pviiekvpge
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241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
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Show:

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BLink, Domains, Links

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 DEFINITION pyrogenic exotoxin B.  
 ACCESSION AAA27012  
 VERSION AAA27012.1 GI:431680  
 DBSOURCE locus STRSPEBV accession [L26146.1](#)  
 KEYWORDS .  
 SOURCE Streptococcus pyogenes  
 ORGANISM [Streptococcus pyogenes](#)  
 Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
 Streptococcus.  
 REFERENCE 1 (residues 1 to 398)  
 AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
 Hamill, R.J., Patti, J.M. and Musser, J.M.  
 TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
 cleaves human fibronectin and degrades vitronectin  
 JOURNAL *Microb. Pathog.* (1993) In press  
 COMMENT Method: conceptual translation.  
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 /isolate="MGAS 315"  
 /isolate="MGAS 1251"  
 /isolate="MGAS 1893"  
 /isolate="MGAS 1590"  
 /isolate="MGAS 1864"  
 /isolate="MGAS 327"  
 /isolate="MGAS 317"  
 /db\_xref="taxon:1314"  
Protein 1..398  
 /product="pyrogenic exotoxin B"  
 /function="cysteine protease precursor"  
CDS 1..398  
 /gene="speB gene"  
 /coded\_by="L26146.1:161..1357"  
 /note="allele 3"  
 /transl\_table=11  
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 361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp  
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1: AAA27013. pyrogenic exotoxin B [gi:431682]

BLINK, Domains, Links

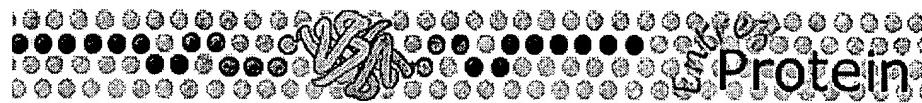
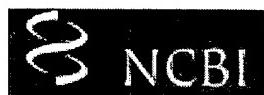
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 DEFINITION pyrogenic exotoxin B.  
 ACCESSION AAA27013  
 VERSION AAA27013.1 GI:431682  
 DBSOURCE locus STRSPEBW accession L26147.1  
 KEYWORDS .  
 SOURCE Streptococcus pyogenes  
 ORGANISM Streptococcus pyogenes  
 Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
 Streptococcus.  
 REFERENCE 1 (residues 1 to 398)  
 AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
 Hamill, R.J., Patti, J.M. and Musser, J.M.  
 TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
 cleaves human fibronectin and degrades vitronectin  
 JOURNAL Microb. Pathog. (1993) In press  
 COMMENT Method: conceptual translation.  
 FEATURES Location/Qualifiers  
 source 1..398  
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 /isolate="MGAS 1838"  
 /db\_xref="taxon:1314"  
Protein 1..398  
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CDS 1..398  
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#### ORIGIN

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  241 nwnnilptys gresnvqkma iselmadvgi svdmdygps sagsrvqr alkenfgynq
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1: AAA27014. pyrogenic exotoxin B [gi:431684]  BLINK, Domains, Links

LOCUS AAA27014 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA27014

VERSION AAA27014.1 GI:431684

DBSOURCE locus STRSPEBX accession L26148.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R., Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398

/organism="Streptococcus pyogenes"  
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Protein 1..398

/product="pyrogenic exotoxin B"  
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CDS 1..398

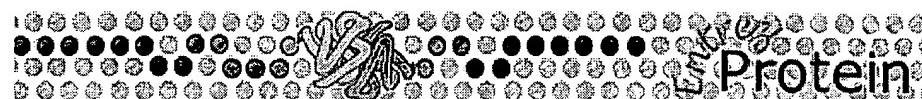
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ORIGIN

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241 nwnnilptys gresnvqkma iselmadvgi svdmdygps gsagssrvqr alkenfgnyq
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361 gvsdgffrld alnpsalgtg ggaggfnqyq savvgikp
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BLINK, Domains, Links

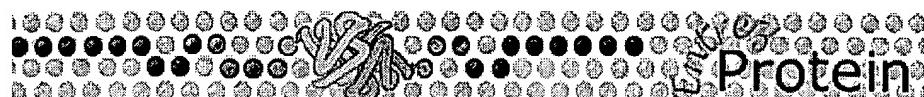
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**DEFINITION** pyrogenic exotoxin B.  
**ACCESSION** AAA27015  
**VERSION** AAA27015.1 GI:431686  
**DBSOURCE** locus STRSPEBY accession L26149.1  
**KEYWORDS**  
**SOURCE** Streptococcus pyogenes  
**ORGANISM** Streptococcus pyogenes  
Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.  
**REFERENCE** 1 (residues 1 to 398)  
**AUTHORS** Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.  
**TITLE** A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin  
**JOURNAL** Microb. Pathog. (1993) In press  
**COMMENT** Method: conceptual translation.  
**FEATURES** Location/Qualifiers  
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**Protein** 1..398  
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**CDS** 1..398  
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/note="allele 32"  
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121 mesyveqike nkkldttypag taeikgpvvk slldskgihy nqgnpynllt pviiekvpge
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361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
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 1: AAA27016. pyrogenic exotoxi...[gi:431688]

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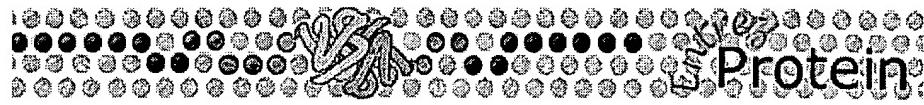
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**DEFINITION** pyrogenic exotoxin B.  
**ACCESSION** AAA27016  
**VERSION** AAA27016.1 GI:431688  
**DBSOURCE** locus STRSPEBZ accession L26150.1  
**KEYWORDS**  
**SOURCE** Streptococcus pyogenes  
**ORGANISM** Streptococcus pyogenes  
Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.  
**REFERENCE** 1 (residues 1 to 398)  
**AUTHORS** Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.  
**TITLE** A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin  
**JOURNAL** Microb. Pathog. (1993) In press  
**COMMENT** Method: conceptual translation.  
**FEATURES** Location/Qualifiers  
**source** 1..398  
/organism="Streptococcus pyogenes"  
/isolate="MGAS 1832"  
/db\_xref="taxon:1314"  
**Protein** 1..398  
/product="pyrogenic exotoxin B"  
/function="cysteine protease precursor"  
**CDS** 1..398  
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**ORIGIN**

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181 qsfvgqhaat g@vatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrgdf skqdweaqid kelsqnqpvy yqgvgkvgg@ afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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1: AAA26980. pyrogenic exotoxin B.[gi:431616] [BLink](#), [Domains](#), [Links](#)

LOCUS AAA26980 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26980

VERSION AAA26980.1 GI:431616

DBSOURCE locus STRSPEBAA accession L26151.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

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           /db\_xref="taxon:1314"

Protein 1..398  
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CDS 1..398  
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1: [AAA26981. pyrogenic exotoxin B \[gi:431618\]](#)

LOCUS AAA26981 398 aa linear BCT 02-DEC-1993  
 DEFINITION pyrogenic exotoxin B.  
 ACCESSION AAA26981  
 VERSION AAA26981.1 GI:431618  
 DBSOURCE locus STRSPEBAB accession [L26152.1](#)  
 KEYWORDS .  
 SOURCE Streptococcus pyogenes  
 ORGANISM Streptococcus pyogenes  
 Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
 Streptococcus.  
 REFERENCE 1 (residues 1 to 398)  
 AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
 Hamill,R.J., Patti,J.M. and Musser,J.M.  
 TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
 cleaves human fibronectin and degrades vitronectin  
 JOURNAL Microb. Pathog. (1993) In press  
 COMMENT Method: conceptual translation.  
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 source 1..398  
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 CDS 1..398  
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 /transl\_table=11

## ORIGIN

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  1 mnkkklgirl lsllalggfv lanpvfadqn farnekeakd saitfiqksa aikagarsae
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  241 nwnnilpty sgresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
  301 svhqvnrnsdf skqdweaqid kelsqnqpvy yqgvgkvggh afvidgadgr nfyhvwgwg
  361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
  //
```

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1: [AAA26982. pyrogenic exotoxin B.](#) [gi:431620]

[BLink](#), [Domains](#), [Links](#)

LOCUS AAA26982 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26982

VERSION AAA26982.1 GI:431620

DBSOURCE locus STRSPEBAC accession [L26153.1](#)

KEYWORDS .

SOURCE *Streptococcus pyogenes*

ORGANISM *Streptococcus pyogenes*

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
*Streptococcus*.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved *Streptococcus pyogenes* extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL *Microb. Pathog.* (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398

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/isolate="MGAS 1842"  
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Protein 1..398

/product="pyrogenic exotoxin B"  
/function="cysteine protease precursor"

CDS 1..398

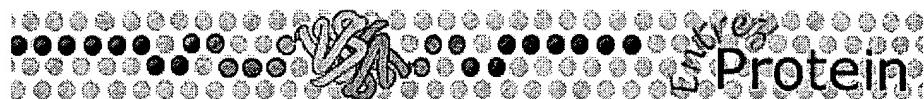
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121 mesyveqike nkkldttypag taeikqpvvk slldskgiyh nqgnpynlt pviiekvpge
181 qsfvgqhaat gqvataqa mkyhnypnkg lkdtytlss npyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrgdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvngwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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Feat

 1: AAA26983. pyrogenic exotoxin B...[gi:431622]

BLINK, Domains, Links

**LOCUS** AAA26983 398 aa linear BCT 02-DEC-1993  
**DEFINITION** pyrogenic exotoxin B.  
**ACCESSION** AAA26983  
**VERSION** AAA26983.1 GI:431622  
**DBSOURCE** locus STRSPEBAD accession L26154.1  
**KEYWORDS**  
**SOURCE** Streptococcus pyogenes  
**ORGANISM** Streptococcus pyogenes  
Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.  
**REFERENCE** 1 (residues 1 to 398)  
**AUTHORS** Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
Hamill, R.J., Patti, J.M. and Musser, J.M.  
**TITLE** A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin  
**JOURNAL** Microb. Pathog. (1993) In press  
**COMMENT** Method: conceptual translation.  
**FEATURES** Location/Qualifiers  
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/isolate="MGAS 1882"  
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**Protein** 1..398  
/product="pyrogenic exotoxin B"  
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**CDS** 1..398  
/gene="speB gene"  
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**ORIGIN**

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181 qsfvgqhaat g@vatataqi mkyhnypnkg lkdtyt1ss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdweaqid kelsqnqpv yqgvgkvgg afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
```

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Feat

1: AAA26984. pyrogenic exotoxi...[gi:431624]

BLink, Domains, Links

LOCUS AAA26984 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26984

VERSION AAA26984.1 GI:431624

DBSOURCE locus STRSPEBAE accession L26155.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

1..398  
/organism="Streptococcus pyogenes"  
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Protein

1..398  
/product="pyrogenic exotoxin B"  
/function="cysteine protease precursor"

CDS

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ORIGIN

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181 qsfvgqhaat g@yatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy  
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpsS gsagssrvqr alkenfgynq  
301 svhqinrgdf skqdweaqid kelsqngpvy yqgvgkvgg**H** afvidgadgr nfyhv**W**wgwg  
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp

//

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Features

1: AAA26985. pyrogenic exotoxin B [gi:431626]

BLink, Domains, Links

LOCUS AAA26985 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26985

VERSION AAA26985.1 GI:431626

DBSOURCE locus STRSPEBAF accession L26156.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398

/organism="Streptococcus pyogenes"  
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/db\_xref="taxon:1314"

Protein 1..398

/product="pyrogenic exotoxin B"  
/function="cysteine protease precursor"

CDS 1..398

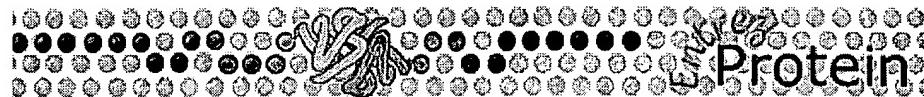
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ORIGIN

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361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
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BLINK, Domains, Links

LOCUS AAA26986 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26986

VERSION AAA26986.1 GI:431628

DBSOURCE locus STRSPEBAG accession L26157.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

1..398  
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Protein

1..398  
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/function="cysteine protease precursor"

CDS

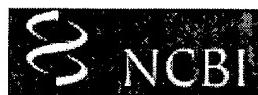
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ORIGIN

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361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
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1: AAA26987. pyrogenic exotoxin B...[gi:431630]

LOCUS AAA26987 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26987

VERSION AAA26987.1 GI:431630

DBSOURCE locus STRSPEBAH accession L26158.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R., Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398

/organism="Streptococcus pyogenes"

/isolate="MGAS 321"

/isolate="MGAS 789"

/db\_xref="taxon:1314"

Protein 1..398

/product="pyrogenic exotoxin B"

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/gene="speB gene"

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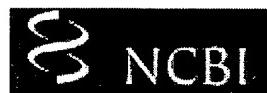
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ORIGIN

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361 gvsdgffrld alnpsalgtg ggaggfngyyq savvgikp
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Feat

1: AAA26988. pyrogenic exotoxi...[gi:431632]

BLink, Domains, Links

LOCUS AAA26988 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26988

VERSION AAA26988.1 GI:431632

DBSOURCE locus STRSPEBAI accession L26159.1

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

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Protein

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ORIGIN

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361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp

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1: AAA26989. pyrogenic exotoxi...[gi:431634]

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LOCUS AAA26989 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26989

VERSION AAA26989.1 GI:431634

DBSOURCE locus STRSPEBAJ accession L26160.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur,V., Topouzis,S., Majesky,M.W., Li,L.-L., Hamrick,M.R.,  
Hamill,R.J., Patti,J.M. and Musser,J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source

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Protein

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 /product="pyrogenic exotoxin B"  
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CDS

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ORIGIN

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  241 nwnnilptys gresnvqkma iselmadvgi svdmdygps gsagssrvqr alkenfgynq
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1: AAA26990. pyrogenic exotoxi...[gi:431636]

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LOCUS AAA26990 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26990

VERSION AAA26990.1 GI:431636

DBSOURCE locus STRSPEBAK accession [L26161.1](#)

KEYWORDS .

SOURCE Streptococcus pyogenes

ORGANISM [Streptococcus pyogenes](#)

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae;  
Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R.,  
Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease  
cleaves human fibronectin and degrades vitronectin

JOURNAL [Microb. Pathog.](#) (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398  
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           /isolate="MGAS 660"  
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Protein 1..398  
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           /function="cysteine protease precursor"

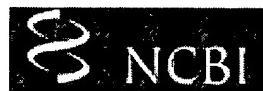
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#### ORIGIN

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301 svhqinrsdf skqdweaqid kelsqnqpvY yqgvgkvgg@ afvidgadgr nfyhv@wgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
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Features

1: AAA26991. pyrogenic exotoxin B [gi:431638]

BLink, Domains, Links

LOCUS AAA26991 398 aa linear BCT 02-DEC-1993

DEFINITION pyrogenic exotoxin B.

ACCESSION AAA26991

VERSION AAA26991.1 GI:431638

DBSOURCE locus STRSPEBAL accession L26162.1

KEYWORDS

SOURCE Streptococcus pyogenes

ORGANISM Streptococcus pyogenes

Bacteria; Firmicutes; Bacillus/Clostridium group; Streptococcaceae; Streptococcus.

REFERENCE 1 (residues 1 to 398)

AUTHORS Kapur, V., Topouzis, S., Majesky, M.W., Li, L.-L., Hamrick, M.R., Hamill, R.J., Patti, J.M. and Musser, J.M.

TITLE A conserved Streptococcus pyogenes extracellular cysteine protease cleaves human fibronectin and degrades vitronectin

JOURNAL Microb. Pathog. (1993) In press

COMMENT Method: conceptual translation.

FEATURES Location/Qualifiers

source 1..398  
           /organism="Streptococcus pyogenes"  
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           /db\_xref="taxon:1314"

Protein 1..398  
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           /function="cysteine protease precursor"

CDS 1..398  
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       /coded\_by="L26162.1:161..1357"  
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       /transl\_table=11

#### ORIGIN

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121 mesyveqike nkkldttypag taeikqpvvk slldskgiyh nqgnpynllt pviekvpge
181 qsfvgqhaat gcvatataqi mkyhnypnkg lkdytytlss nnpyfnhpkn lfaaistrqy
241 nwnnilptys gresnvqkma iselmadvgi svdmdygpss gsagssrvqr alkenfgynq
301 svhqinrsdf skqdweaqid kelsqnqpvy yqgvgkvgg afvidgadgr nfyhvwgwg
361 gvsdgffrld alnpsalgtg ggaggfngyq savvgikp
//
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